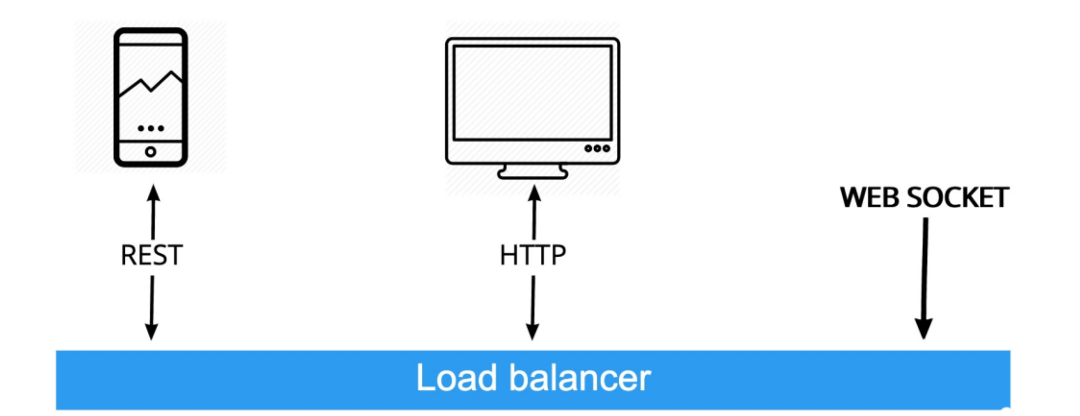
Микросервисы с нуля

Семен Катаев
www.avito.ru






WEB SOCKET
REST
HTTP
Load balancer

WEB SOCKET

REST

HTTP

Load balancer

Reverse proxy

avi-
http



WEB SOCKET

REST

HTTP

Load balancer

avi-
http

app03



WEB SOCKET

REST

HTTP

Load balancer

Reverse proxy

avi-http

avi-http

1 ... 10

avi-http

app03



REST

HTTP

WEB SOCKET

Load balancer

Reverse proxy

avi-http

avi-http

1 ... 10

avi-http

Application

app01

app02

app03

1 ... n

appNN

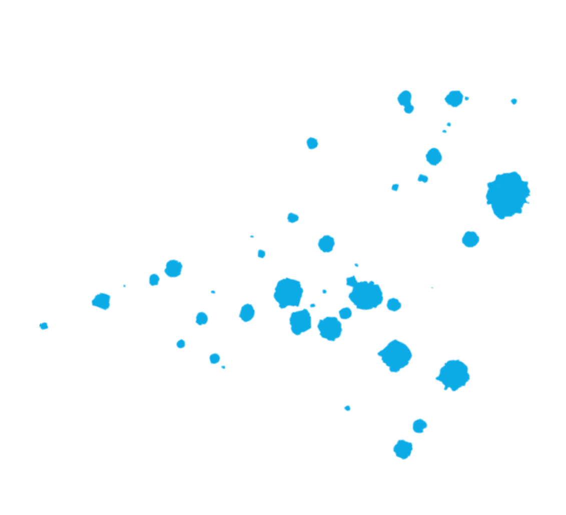




Base Complexity



Productivity



Base Complexity



Productivity

Monolith

Base Complexity

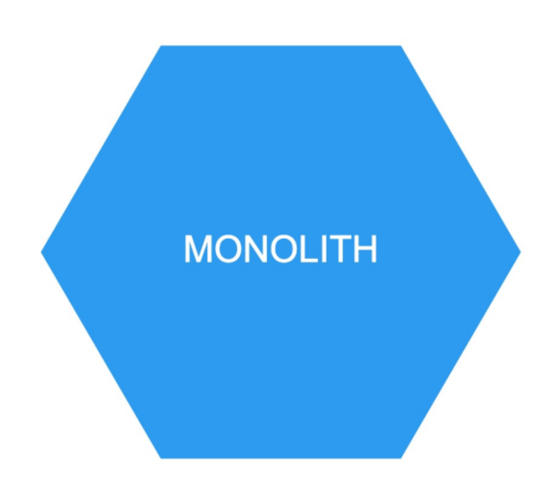


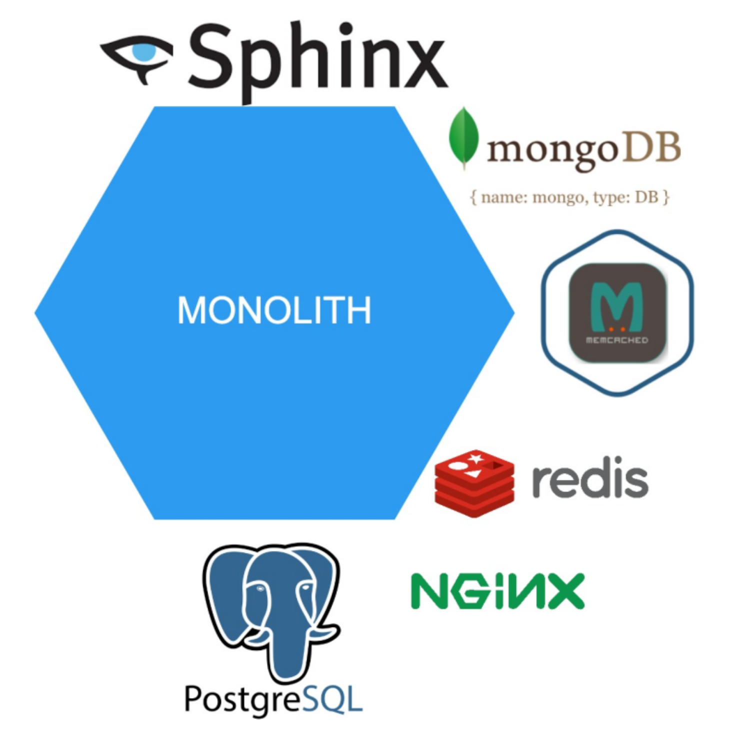
Микросервисная архитектура

Модульный подход к разработке программного обеспечения, основанный на использовании ***распределённых***, слабо ***зацепленных*** (англ. loose coupling) заменяемых компонентов, оснащённых стандартизированными интерфейсами для взаимодействия по стандартизированным протоколам

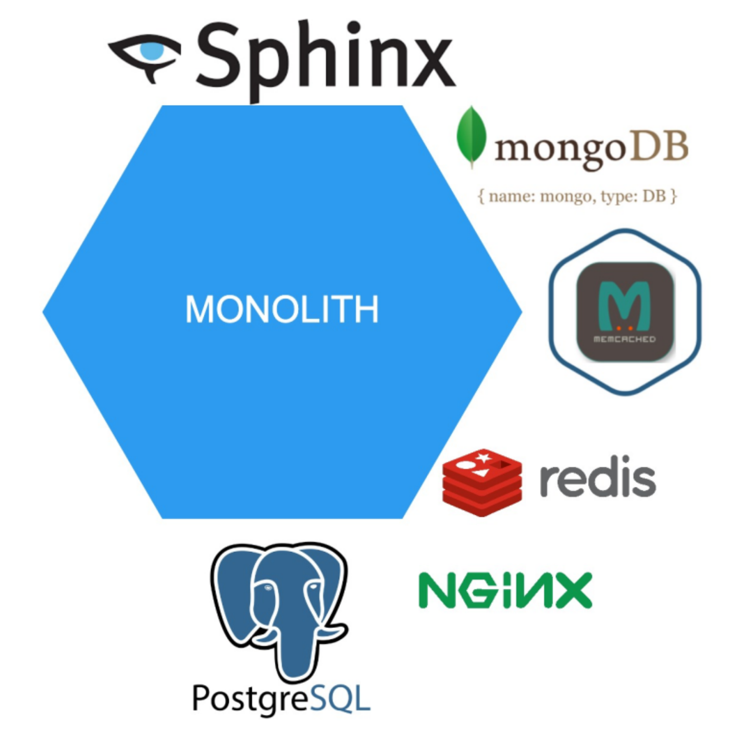
HTTP
HTTP
HTTP
HTTP
API GATEWAY
AMQP
HTTP
HTTP
HTTP
Relational DB
Key / Value Store

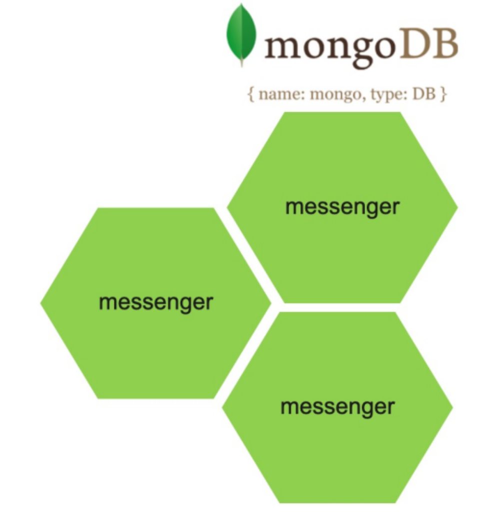


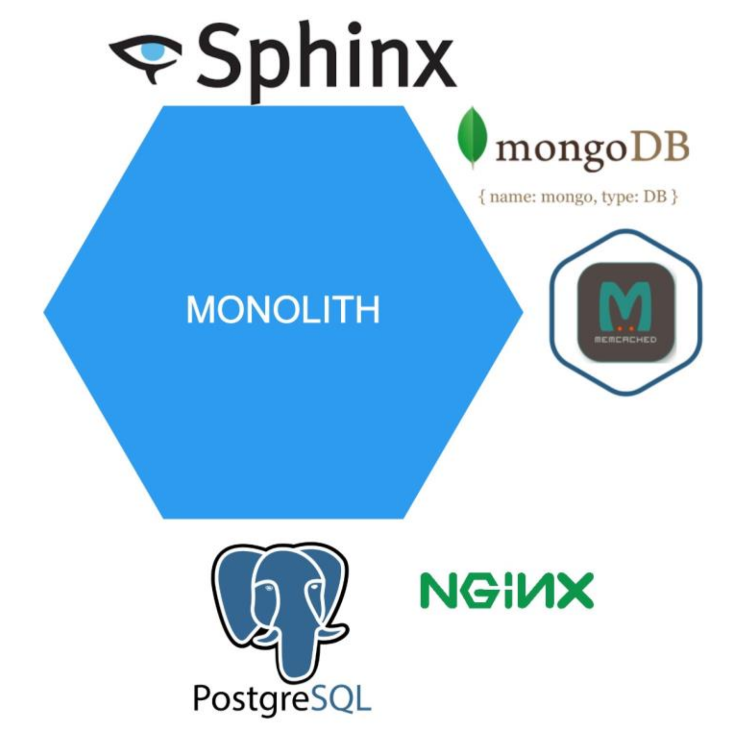

MONOLITH

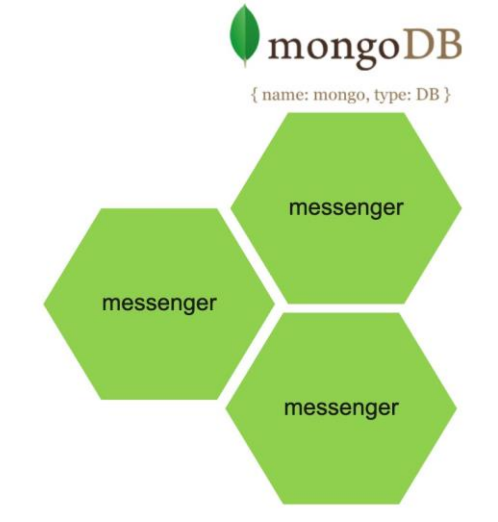

Sphinx
mongoDB
{ name: mongo, type: DB }
MONOLITH
MEMCACHED
redis
NGINX
PostgreSQL

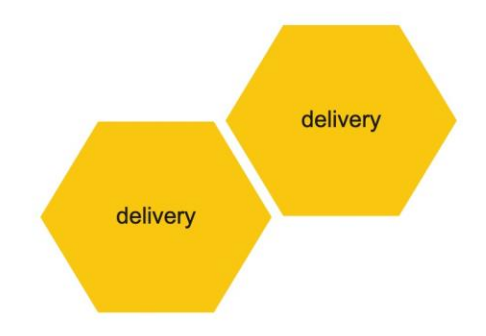

HL
HighLoad++
Весна 2021


Sphinx
mongoDB
{ name: mongo, type: DB }
MONOLITH
MEMCACHED
redis
PostgreSQL
NGINX


mongoDB
{ name: mongo, type: DB }
messenger
messenger
messenger


Sphinx
mongoDB
{ name: mongo, type: DB }
MONOLITH
MEMCACHED
NGINX
PostgreSQL


mongoDB
{ name: mongo, type: DB }
messenger
messenger
messenger


delivery
delivery


HL
HighLoad++
Весна 2021

Sphinx

mongoDB

{ name: mongo, type: DB }

MONOLITH

MEMCACHED

PostgreSQL

NGINX

mongoDB

{ name: mongo, type: DB }

messenger

messenger

messenger

user

user

delivery

delivery



Микросервисы в avito

- Больше **1.0к** микросервисов

- Около **200 критичных** микросервисов

- **2.5к** баз данных

- До **200** деплоев каждый день

- **3.0k** git-репозиториев

SPLIT THE MONOLITH

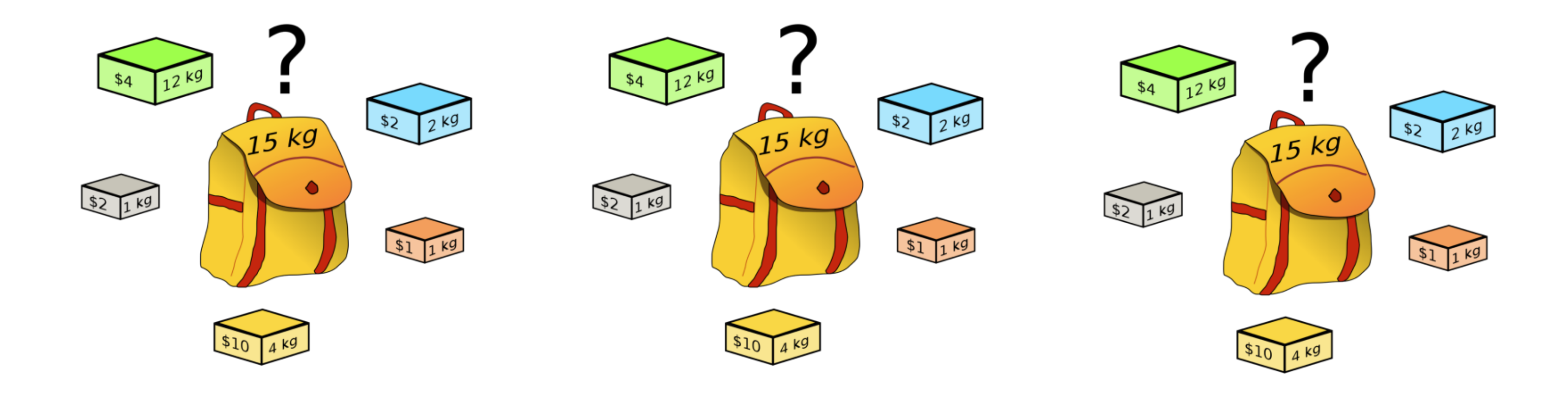


10 000 +

Runtime для более чем 10 000 микроприложений



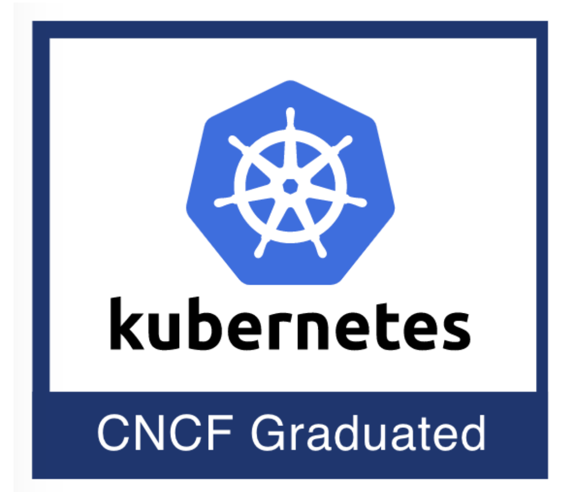
Runtime для 10 000+ приложений





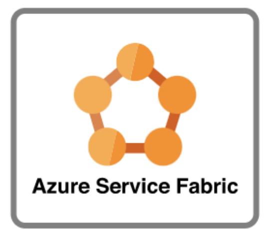


Scheduling & Orchestration

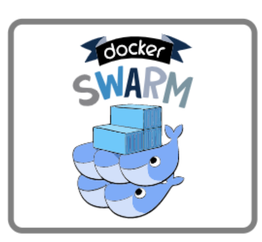
























Scheduling & Orchestration

UI

API

CLI

master

Node 1

Node 2

Node N

miro





Scheduling & Orchestration

UI

API

CLI

master

Node 1

Node 2

Node N

miro





Scheduling & Orchestration

UI

API

CLI

master

Node 1

Node 2

Node N

miro





Scheduling & Orchestration

UI

API

CLI

master

Node 1

Node 2

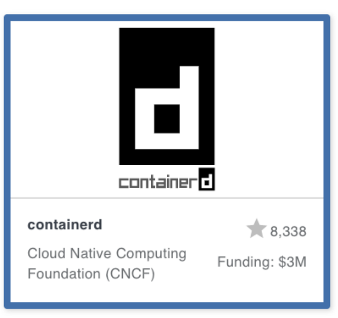
Node N

miro

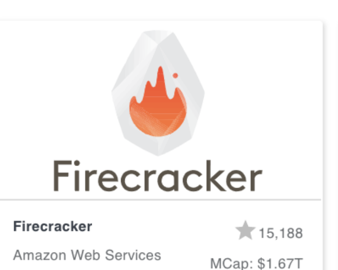


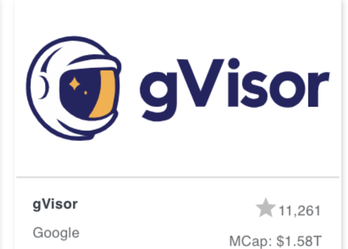


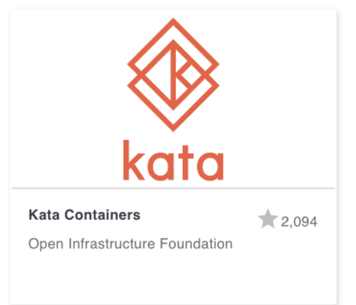
Container Runtime

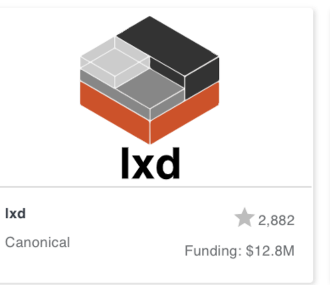


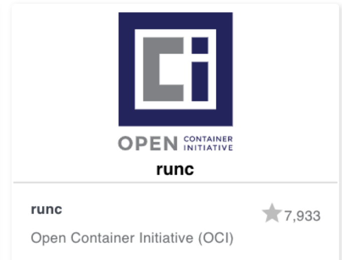


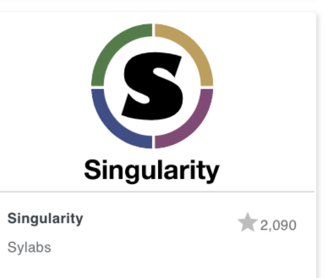


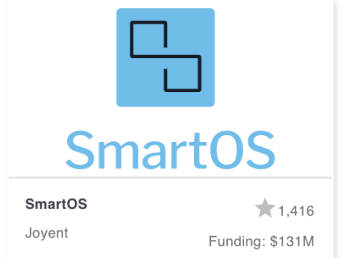


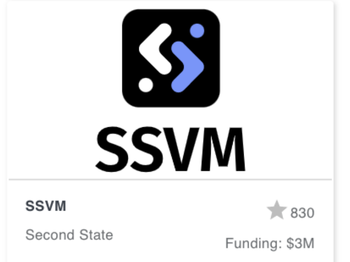






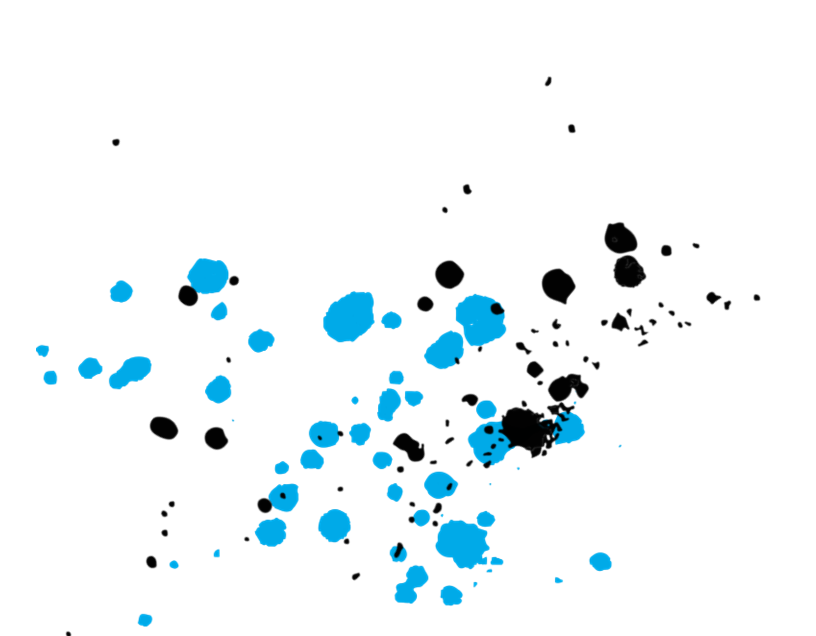






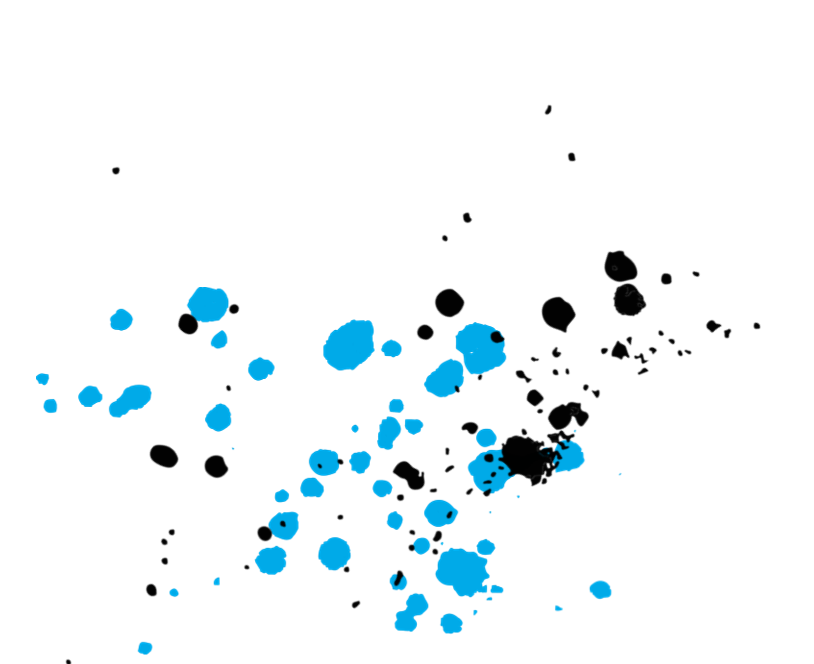


Container Runtime



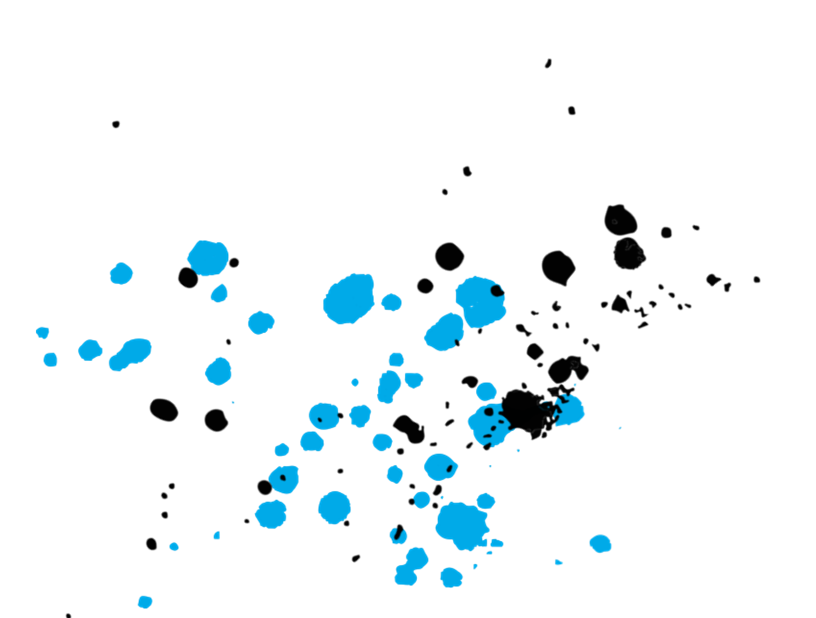


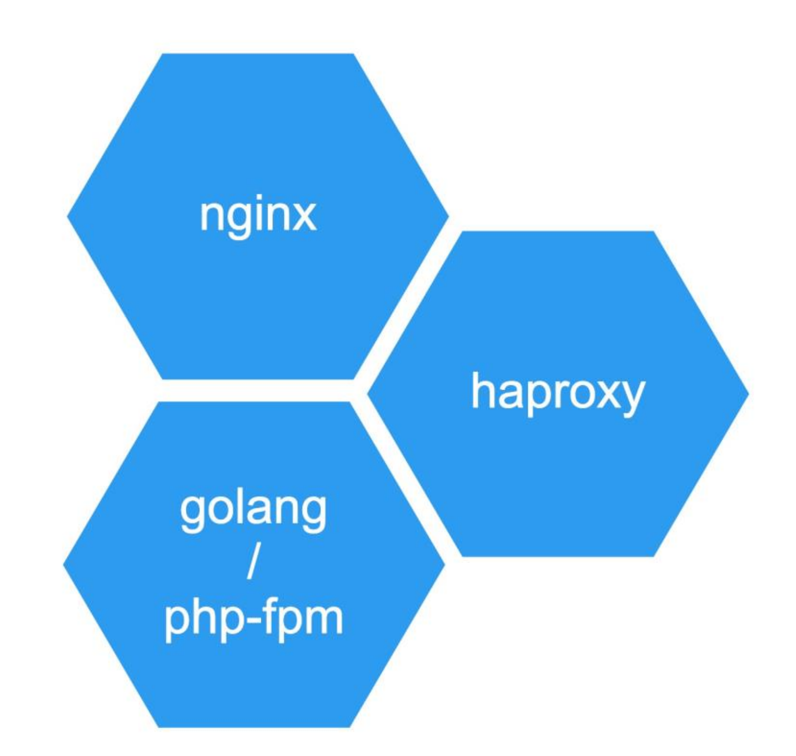
Container Runtime



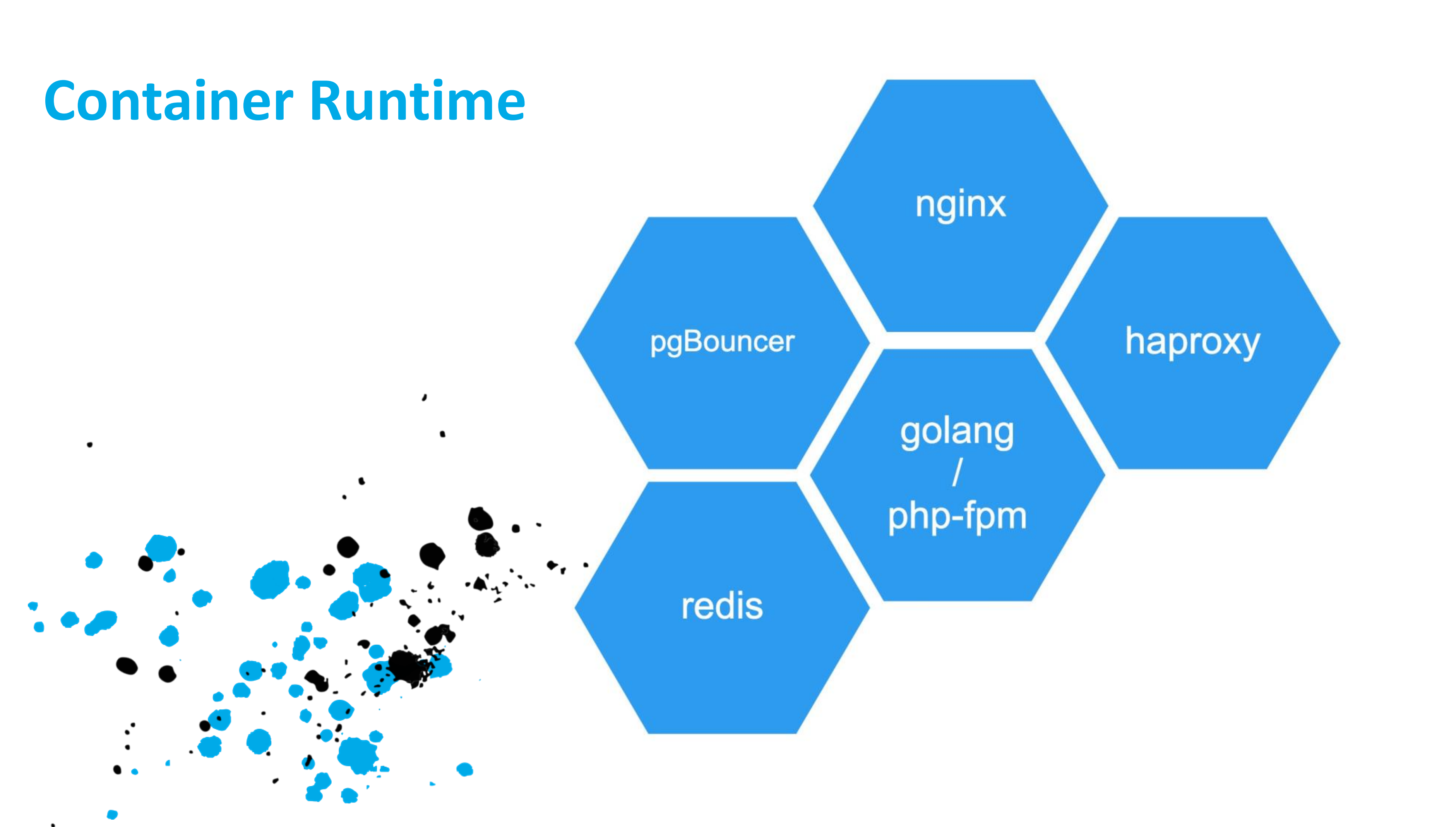


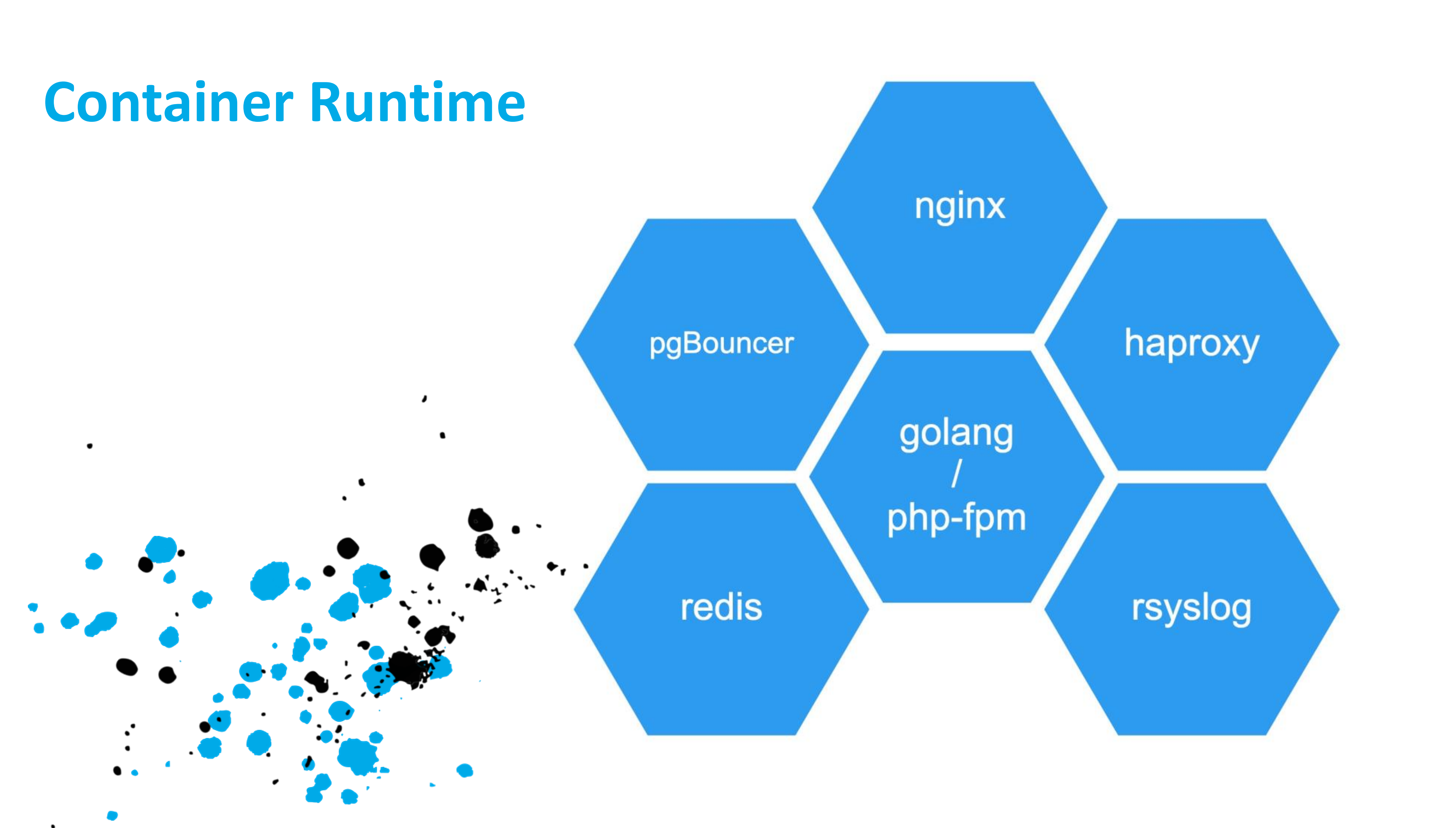
Container Runtime





Container Runtime




Container Runtime
nginx
pgBouncer
haproxy
golang
/
php-fpm
redis
rsyslog

Container Runtime



nginx

pgBouncer

haproxy

golang
/
php-fpm

redis

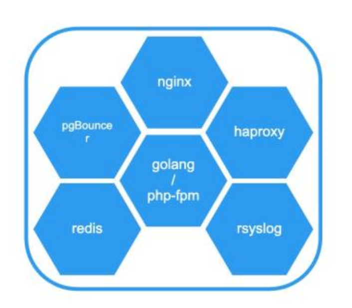
rsyslog

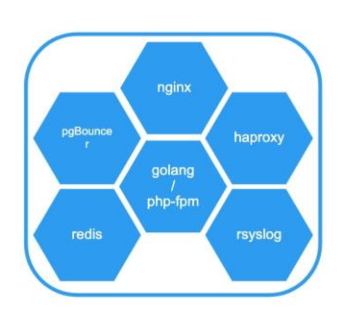


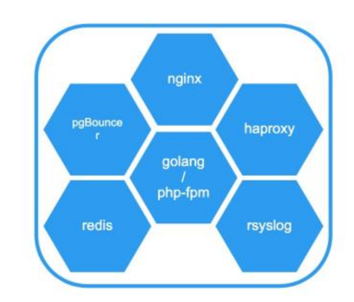
Container Runtime

6 реплик сервиса

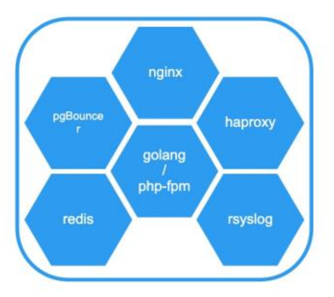
горизонтальное масштабирование

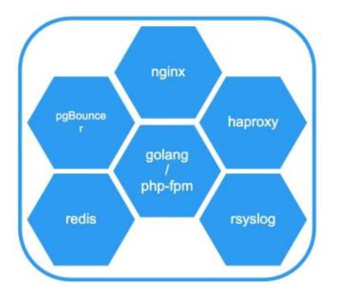














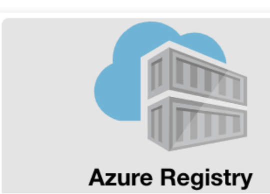
Container Runtime/Registry



Alibaba Cloud Container Registry (ACR) MCap: $617.93B
Alibaba Cloud



Amazon Elastic Container Registry (ECR) MCap: $1.67T
Amazon Web Services



Azure Registry MCap: $1.87T
Microsoft



Docker Registry ★ 6,128
Docker
Funding: $330.86M

Dragonfly

Dragonfly ★ 5,521
Cloud Native Computing Foundation (CNCF)
Funding: $3M



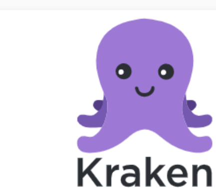
Harbor ★ 14,627
Cloud Native Computing Foundation (CNCF)
Funding: $3M



IBM Cloud Container Registry MCap: $130.23B
IBM



JFrog Artifactory MCap: $4.16B
JFrog

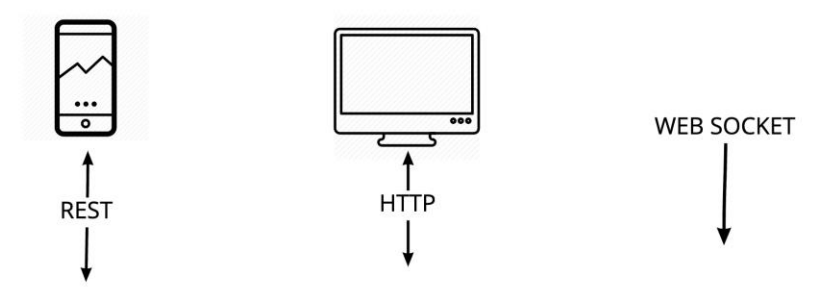


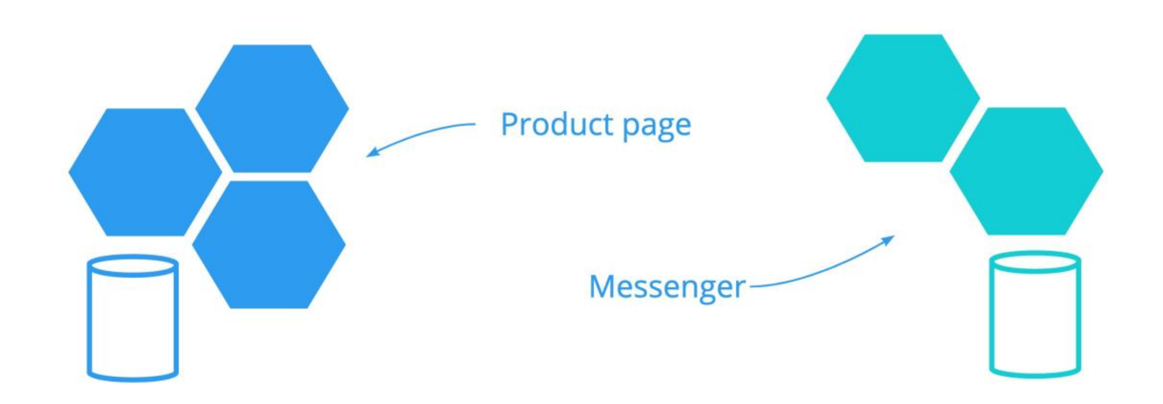
Kraken ★ 4,459
Uber
MCap: $98.95B

Portus

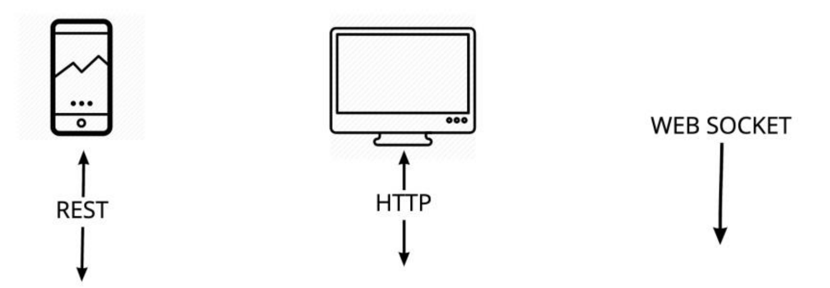
Portus ★ 2,812
SUSE



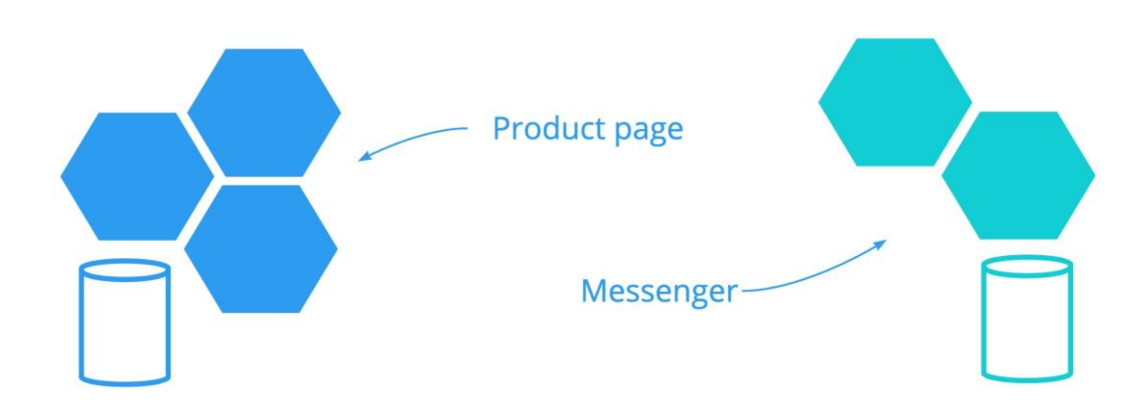

REST
HTTP
WEB SOCKET


Product page
Messenger


HL
HighLoad++
Весна 2021



https://**www.avito.ru**/iPhone11
https://**www.avito.ru**/profile/messenger





REST

HTTP

WEB SOCKET

API Gateway

Product page

Messenger



API Gateway

- Application firewall/Rate limits
- Authentication
- Metrics/monitoring/logging
- SSL termination
- Secure breaker
- Retry
- Caching

REST
HTTP
WEB SOCKET
API Gateway
Product page
Messenger



API Gateway


CLOUD NATIVE
COMPUTING FOUNDATION


3SCALE


akana


Ambassador


APIOAK


APISIX


Gloo


GRAVITEE·IO


Kong


krakenD


MuleSoft


Reactive
Interaction
Gateway


Sentinel


Tyk


WSO2
API Microgateway


HL
HighLoad++
Весна 2021

API Gateway

С внешних балансеров

L3-L4

трафик проксируем в k8s

на ingress API-Gateway, который

является балансером L7 или application layer.

WEB SOCKET

Load balancer

k8s

Authentications

Monitoring

ACL

Rate-limit

Logging

Caching

Plugins

Transformations

Product page

Catalog

Messenger




CLOUD NATIVE
COMPUTING FOUNDATION

API Gateway


3SCALE

akana

Ambassador

APIOAK

APISIX

Gloo

GRAVITEE·IO

Kong

krakenD

MuleSoft

Reactive
Interaction
Gateway

Sentinel

Tyk

WSO2
API Microgateway

HL
HighLoad++
Весна 2021

Межсервисные взаимодействия

- Договориться о протоколе
- Подписи запросов
- sdk/client для сервисов/кодогенерация
- Коды ошибок



Межсервисные взаимодействия

Создайте в компании документ, описывающий принципы межсервисных взаимодействий.

→ composer install avito/service-item-composition-client

→ go get avito/service-user-client

→ avito service codegen



Remote Procedure Call



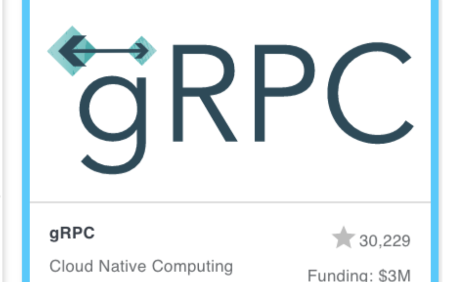
Apache Thrift ★ 8,279
The Apache Software Foundation



Avro ★ 1,822
The Apache Software Foundation



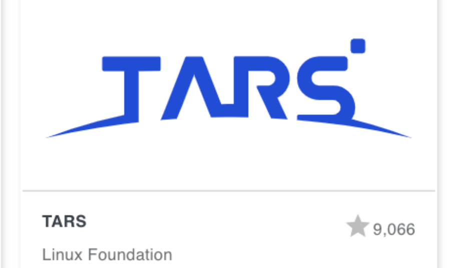
Dubbo ★ 35,159
The Apache Software Foundation



gRPC ★ 30,229
Cloud Native Computing Foundation (CNCF)
Funding: $3M



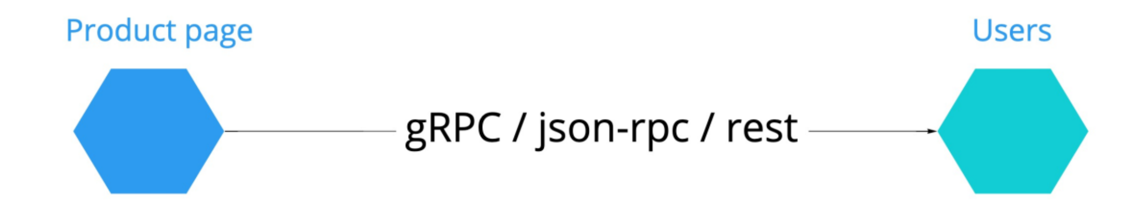
SOFARPC ★ 3,317
Ant Group
MCap: $617.5B



TARS ★ 9,066
Linux Foundation



Межсервисные взаимодействия




```
curl --request POST 'http://user.user/get' \
--data-raw '{"id": 1}'
```



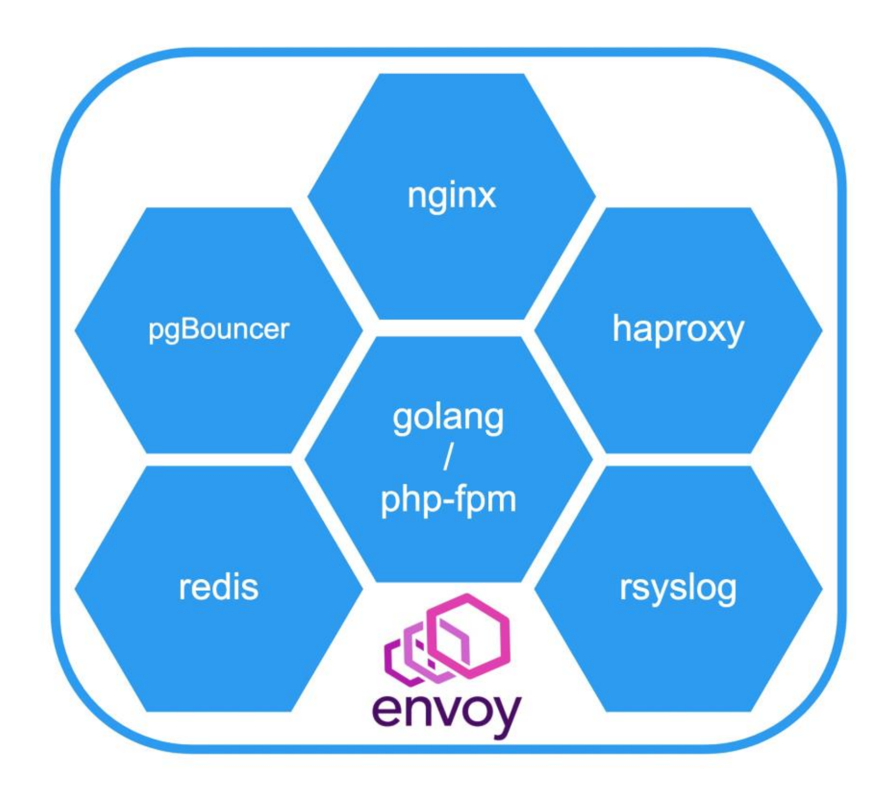
Service proxy




```
curl --request POST 'http://user.user/get' \
--data-raw '{"id": 1}'
```

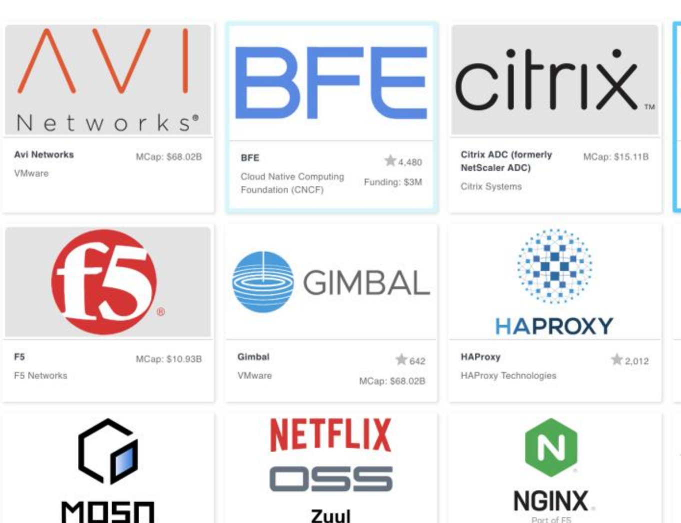


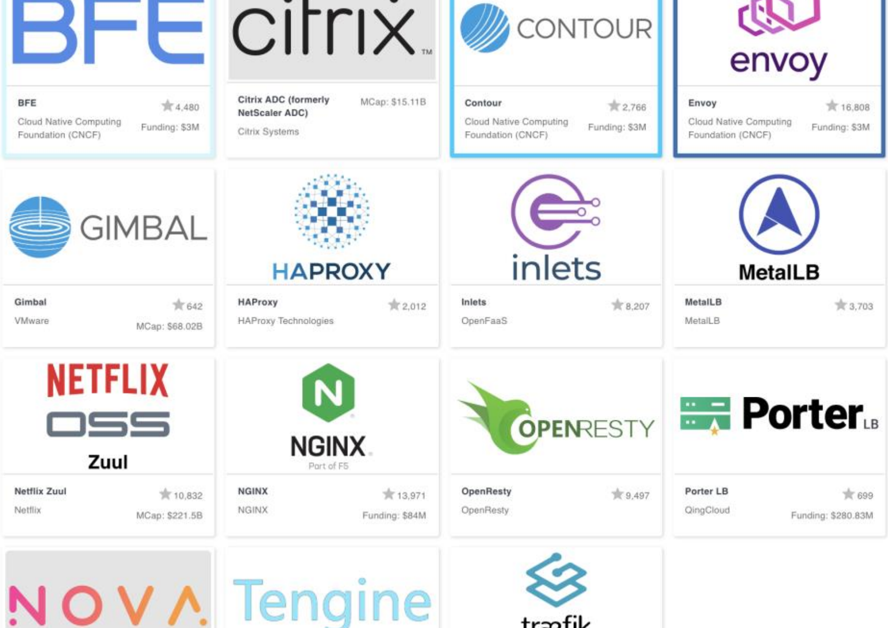
Service proxy





Service proxy







Service proxy

- retry
- secure breaker
- tracing
- metrics
- monitoring





Tracing

routing-gateway: /js/toggles 37e9764

Find... | Trace Timeline

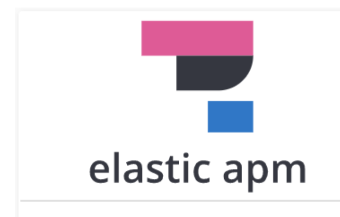
Trace Start **May 5 2021, 09:30:18**.863 | Duration **74.48ms** | Services **6** | Depth **6** | Total Spans **10**

0μs | 18.62ms | 37.24ms | 55.86ms | 74.48ms

Service & Operation	Duration
routing-gateway /js/toggles	
avito-api-gateway /js/toggles	7…
avito-api-gateway /js/toggles	68.1ms
avito-site /js/toggles	66.89ms
avito-site /user/1/featurebytag	6.56ms
split-tests-go-staging /user/1/f...	5.44ms
avito-site /tree	2.29ms
rubricator-staging /tree	1.18ms
avito-site /url/v2/buildBatch	4.99ms
u8r-staging /url/v2/buildBatch	3.27ms



Tracing



Elastic APM — ★ 892
Elastic
MCap: $9.93B



Honeycomb — Funding: $46.9M
Honeycomb



Jaeger — ★ 13,368
Cloud Native Computing Foundation (CNCF)
Funding: $3M



LightStep — Funding: $70M
LightStep



OpenTelemetry — ★ 1,624
Cloud Native Computing Foundation (CNCF)
Funding: $3M



Pinpoint — ★ 11,364
Pinpoint

SkyWalking — ★ 16,728
The Apache Software Foundation

SOFATracer

SOFATracer — ★ 893
Ant Group
MCap: $617.93B



Spring Cloud Sleuth — ★ 1,447
VMware
MCap: $67.32B



Zipkin — ★ 14,319
Zipkin



Tracing



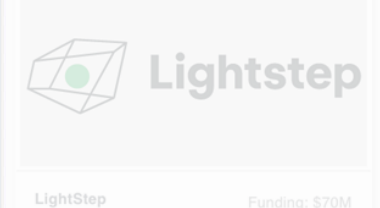
Elastic APM ★ 892
Elastic MCap: $9.93B



Honeycomb Funding: $46.9M
Honeycomb



Jaeger ★ 13,368
Cloud Native Computing Foundation (CNCF) Funding: $3M



LightStep Funding: $70M
LightStep



OpenTelemetry ★ 1,624
Cloud Native Computing Foundation (CNCF) Funding: $3M



Pinpoint ★ 11,364
Pinpoint



SkyWalking ★ 16,728
The Apache Software Foundation

SOFATracer

SOFATracer ★ 893
Ant Group MCap: $617.93B



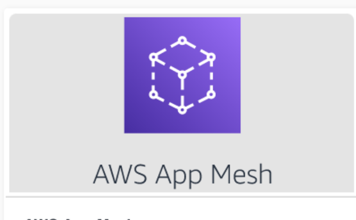
Spring Cloud Sleuth

Spring Cloud Sleuth ★ 1,447
VMware MCap: $67.32B



Zipkin ★ 14,319
Zipkin

Service mesh



AWS App Mesh MCap: $1.67T
Amazon Web Services



Consul ★ 21,994
HashiCorp
Funding: $349.18M



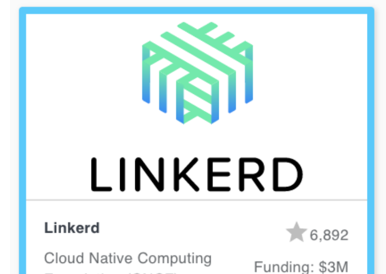
Gloo Mesh ★ 861
Solo.io
Funding: $36.5M



Grey Matter
Greymatter.io



Istio ★ 26,869
Google
MCap: $1.56T



Linkerd ★ 6,892
Cloud Native Computing Foundation (CNCF)
Funding: $3M



Meshery ★ 654
Layer5



Open Service Mesh ★ 1,975
Cloud Native Computing Foundation (CNCF)
Funding: $3M

Service Mesh Interface

Service Mesh Interface (SMI) ★ 767
Cloud Native Computing Foundation (CNCF)
Funding: $3M



Traefik Mesh ★ 1,465
Traefik Labs
Funding: $11.06M



Шаблоны сервисов

Созданы шаблоны

php, go, python, nodeJS

сервисов

```
> cat app.toml

name = "autosearch"
description = "Управление сохраненными поисками пользователей"

[engine]
name = "golang"
version = "1.15"
size = "medium"

[postgresql]
size = "medium"
version = "9.6"
use_sample = true

[[dependencies]]
name = "data-bus"

[[dependencies]]
name = ”users"

[[crons]]
name = "subscriptions-new-items-push-instance-one"
schedule = "5/5 * * * *"
command = "/go/bin/cron/subscriptions/new-items-push -instances-count=2
```

Что еще?

- PaaS
- database
- streaming & messenging
- cloud native storage
- logging

и многое другое





Спасибо

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